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09/847,696	05/02/2001	Henricus Johannes Adrianus Stuyt	05032-00010	6199

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EXAMINER

LOWE, MICHAEL S

ART UNIT	PAPER NUMBER
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3652

DATE MAILED: 08/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/847,696

Applicant(s)

STUYT, HENRICUS JOHANNES
ADRIANUS

Examiner

M. Scott Lowe

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-70 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 37-70 is/are allowed.
- 6) ☒ Claim(s) 19,20,23-28,30-36 is/are rejected.
- 7) ☒ Claim(s) 21,22 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 02 January 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Drawings

The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 1/2/03 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Claim Objections

Claims objected to because of the following informalities:

Claim 19, line 3, states "gripper", should state "gripper part".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19, 23-26, 30-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato (US 4,984,959) in view of Matsubara (US 5,982,127).

Re claim 19, Kato teaches a manipulator comprising a foot part 1 and a number of members connected to the foot part 1 and to each other and a gripper part 7 and wherein drive means, in particular motors 16a etc. for the members and gripper are provided in the foot part 1 wherein a first member 31e is rotatable at least 360 degrees

and a second member 51e is rotatable relative to the first member 31e. Kato does not teach compensating means. Matsubara teaches compensating means (not numbered) provided in the foot part for the first and second members to at least partially compensate for the forces exerted by the members. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kato by the teaching of Matsubara to have compensating means that at least partially compensate for the moment exerted by the first member relative to the foot part and by the second member relative to the elbow axis the arrangement being such that during use couples acting on a number of drive means are limited.

Re claim 23, Kato teaches a gripper connected to the upper arm with the drive means (motors) for moving the upper and lower arms and gripper included in the foot part.

Re claim 24, Kato teaches wrist 51c between the second member 51e and the gripper 7, its drive means included in the foot part 1.

Re claim 25, Kato teaches the drive means comprising a series of motors 16a, etc., each coupled to a reduction casing 16b etc., being connected to a drive wheel connected via transmission means to one of a number of drive shafts included in or adjacent a shoulder of parts to be driven (figure 3).

Re claim 26, Kato teaches a number of the reduction cases being identical differing only by position.

Re claim 30, it would have been obvious to one ordinary skill in the art to provide a foot plate and bearings to allow rotation of the foot part 1 to rotate relative to its base

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(not numbered). Likewise it would have been obvious to one ordinary skill in the art to provide sliding contacts, a power supply and a control unit to power and control the system.

Re claim 31, it would have been obvious to one of ordinary skill in the art to make the bearing in a known manner such as matching V-shaped grooves forming a ball track in order to simplify the design.

Re claim 32, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a means for inserting the balls into the ball track and for it to be closable and small as possible to allow for easy maintenance.

Re claim 33, Kato teaches the foot part 1 being substantially tubular with recesses provided for the drive means.

Re claim 34, Kato teaches spaces in the foot part for the spring means, electronic components etc.

Re claim 35, Kato's device is usable in a space unsuitable for human entry such as a radiation space or a toxic space.

Re claim 36, Kato teaches the lower arm 51e rotatable 360 degrees about the elbow axis (not numbered).

Claims 20, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato (US 4,984,959) in view of Matsubara (US 5,982,127) and Stadele (US 5,661,387).

Re claim 20, Kato teaches the shoulder axis and elbow axis substantially parallel and located adjacent opposite ends of the first member 31e, the gripper 7 being rotatable about a first gripper axis. Kato does not teach the gripper axis 90 degrees off of the elbow axis. Stadele teaches (figures 1-2) a gripper with a rotation axis 90 degrees off of an elbow axis to allow greater movement range. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kato to have the additional elbow axis as taught by Stadele in order to have a greater range of movement.

Re claim 27, Kato teaches the shoulder axis and elbow axis substantially parallel and located adjacent opposite ends of the first member 31e, the gripper 7 being rotatable about a first gripper axis. Kato does not teach the gripper axis 90 degrees off of the elbow axis. Stadele teaches (figures 1-2) a gripper with a rotation axis 90 degrees off of an elbow axis to allow greater movement range. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kato to have the additional elbow axis as taught by Stadele in order to have a greater range of movement. As modified Kato teaches a series of first drive shafts (not numbered) extending from the foot part 1 into the first member 31e, a series of second shafts (not numbered) provided in the second member 51e, said drive shafts fitted coaxially within the other while between the shafts a number of bearing means (not numbered) are included. Kato teaches the first and second member movable via the first drive shafts. Kato does not teach driving wheels. However, Matsubara teaches (figure 1) drive wheels and belts as a means of transferring power. It would have been obvious to one

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of ordinary skill in the art at the time the invention was made to have modified Kato to have some drive wheels and their associated belts as taught by Matsubara in order to lighten the assembly as compared to using shafts only.

Re claim 28, Kato teaches a series of third shafts with frustoconical gears (not numbered) transmitted rotational movements of second shafts to third shafts and a number of third shafts connected to a wrist (see figure 2 of Stadele).

Claims 19, 23-26, 30-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato (US 4,984,959) in view of Nishizawa (US 4,803,895).

Re claim 19, Kato teaches a manipulator comprising a foot part 1 and a number of members connected to the foot part 1 and to each other and a gripper part 7 and wherein drive means, in particular motors 16a etc. for the members and gripper are provided in the foot part 1 wherein a first member 31e is rotatable at least 360 degrees and a second member 51e is rotatable relative to the first member 31e. Kato does not teach compensating means. Nishizawa teaches compensating means 18, etc. provided in the foot part for the first and second members to at least partially compensate for the forces exerted by the rotational movement of the members. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kato by the teaching of Nishizawa to have compensating means that at least partially compensate for the moment exerted by the first member relative to the foot part and by the second member relative to the elbow axis the arrangement being such that during use couples acting on a number of drive means are limited.

Re claim 23, Kato teaches a gripper connected to the upper arm with the drive means (motors) for moving the upper and lower arms and gripper included in the foot part.

Re claim 24, Kato teaches wrist 51c between the second member 51e and the gripper 7, its drive means included in the foot part 1.

Re claim 25, Kato teaches the drive means comprising a series of motors 16a, etc., each coupled to a reduction casing 16b etc., being connected to a drive wheel connected via transmission means to one of a number of drive shafts included in or adjacent a shoulder of parts to be driven (figure 3).

Re claim 26, Kato teaches a number of the reduction cases being identical differing only by position.

Re claim 30, it would have been obvious to one ordinary skill in the art to provide a foot plate and bearings to allow rotation of the foot part 1 to rotate relative to its base (not numbered). Likewise it would have been obvious to one ordinary skill in the art to provide sliding contacts, a power supply and a control unit to power and control the system.

Re claim 31, it would have been obvious to one of ordinary skill in the art to make the bearing in a known manner such as matching V-shaped grooves forming a ball track in order to simplify the design.

Re claim 32, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a means for inserting the balls into the ball track and for it to be closable and small as possible to allow for easy maintenance.

Re claim 33, Kato teaches the foot part 1 being substantially tubular with recesses provided for the drive means.

Re claim 34, Kato teaches spaces in the foot part for the spring means, electronic components etc.

Re claim 35, Kato's device is usable in a space unsuitable for human entry such as a radiation space or a toxic space.

Re claim 36, Kato teaches the lower arm 51e rotatable 360 degrees about the elbow axis (not numbered).

Claims 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kato (US 4,984,959) in view of Nishizawa (US 4,803,895) and Stadele (US 5,661,387).

Re claim 20, Kato teaches the shoulder axis and elbow axis substantially parallel and located adjacent opposite ends of the first member 31e, the gripper 7 being rotatable about a first gripper axis. Kato does not teach the gripper axis 90 degrees off of the elbow axis. Stadele teaches (figures 1-2) a gripper with a rotation axis 90 degrees off of an elbow axis to allow greater movement range. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kato to have the additional elbow axis as taught by Stadele in order to have a greater range of movement.

Claims 20, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato (US 4,984,959) in view of Nishizawa (US 4,803,895), Matsubara (US 5,982,127) and Stadele (US 5,661,387).

Re claim 27, Kato teaches the shoulder axis and elbow axis substantially parallel and located adjacent opposite ends of the first member 31e, the gripper 7 being rotatable about a first gripper axis. Kato does not teach the gripper axis 90 degrees off of the elbow axis. Stadele teaches (figures 1-2) a gripper with a rotation axis 90 degrees off of an elbow axis to allow greater movement range. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kato to have the additional elbow axis as taught by Stadele in order to have a greater range of movement. As modified Kato teaches a series of first drive shafts (not numbered) extending from the foot part 1 into the first member 31e, a series of second shafts (not numbered) provided in the second member 51e, said drive shafts fitted coaxially within the other while between the shafts a number of bearing means (not numbered) are included. Kato teaches the first and second member movable via the first drive shafts. Kato does not teach driving wheels. However, Matsubara teaches (figure 1) drive wheels and belts as a means of transferring power. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Kato to have some drive wheels and their associated belts as taught by Matsubara in order to lighten the assembly as compared to using shafts only.

Re claim 28, Kato teaches a series of third shafts with frustoconical gears (not numbered) transmitted rotational movements of second shafts to third shafts and a number of third shafts connected to a wrist (see figure 2 of Stadele).

Allowable Subject Matter

Claims 21-22, 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 37-70 are allowed.

Re claim 21, the prior art taken as a whole does not show nor suggest the compensating means comprising a first eccentric coupled to the first rotary shaft and a second eccentric coupled to the second rotary shaft, first and second spring means coupled to the first and second eccentric respectively, the eccentrics being directed such that at the maximally reachable horizontal position of the relevant arm part, the force exerted on the relevant rotary shaft by the spring means is maximal and at the maximally reachable vertical position of the relevant arm part said force is minimal. The closest prior art, Matsubara, does not include a first eccentric coupled to the first rotary shaft and a second eccentric coupled to the second rotary shaft, first and second spring means coupled to the first and second eccentric respectively, the eccentrics being directed such that at the maximally reachable horizontal position of the relevant arm

part, the force exerted on the relevant rotary shaft by the spring means is maximal and at the maximally reachable vertical position of the relevant arm part said force is minimal as required by the claim and there is no motivation absent the applicant's own disclosure, to modify the Kato reference in the manner required by the claims.

Claim 22 depends from claim 21.

Re claim 29, the prior art taken as a whole does not show nor suggest a spring element extending through the wrist on one side connected to a block slidable in the longitudinal direction of the first member through rotation of one of the third shafts and on the other side connected to the gripper such that upon rotation of the relevant third shaft the block is displaced in longitudinal direction while displacing the spring element and/or changing the length thereof enabling the gripper to be pulled from the open into a closed position or vice versa. The closest prior art, Kato, does not include a spring element extending through the wrist on one side connected to a block slidable in the longitudinal direction of the first member through rotation of one of the third shafts and on the other side connected to the gripper such that upon rotation of the relevant third shaft the block is displaced in longitudinal direction while displacing the spring element and/or changing the length thereof enabling the gripper to be pulled from the open into a closed position or vice versa as required by the claim and there is no motivation absent the applicant's own disclosure, to modify the Kato reference in the manner required by the claims.

Re claims 37, 54, the prior art taken as a whole does not show nor suggest a pair of eccentrics in the foot that compensate for the moments exerted by the upper arm as

it moves about the shoulder axis relative to the foot and by the lower arm as it moves about the elbow axis relative to the upper arm such that couples acting on the motors during use are limited. The closest prior art, Matsubara, does not include a pair of eccentrics in the foot that compensate for the moments exerted by the upper arm as it moves about the shoulder axis relative to the foot and by the lower arm as it moves about the elbow axis relative to the upper arm such that couples acting on the motors during use are limited as required by the claim and there is no motivation absent the applicant's own disclosure, to modify the Kato reference in the manner required by the claims.

Claims 38-53 depend from claim 37.

Claims 55-70 depend from claim 54.

Conclusion

Applicant's arguments filed 6/6/03 have been fully considered but they are not persuasive.

Applicant argued that the references do not teach compensating means located in the foot part for the first and second member that at least partially compensate for the rotational moment exerted by the first member relative to the foot part and by the second member relative to the elbow axis. Matsubara as mentioned by the applicant does teach a compensating means located in a foot part that compensate for the weight moment caused by item 2. The other members attached to item 2 also have weight moments that add to the weight moment of item 2 and the springs by their nature react

to any and all of the forces which are transmitted to them and thus do at least partially compensate for the moments of the first member relative to the foot part as well as the moment of the second member relative to the elbow axis. Also the allowed claims of Matsubara do not limit the compensating means to just item 2. Therefore, the references viewed in view of Matsubara do read on the current claim language of the rejected claims as the springs must at least partially compensate for any force placed on them, rotational or otherwise.

In response to applicant's amended language of the compensating means relating to rotational movement, Nishizawa is used as an added reference, even though it is maintained that the prior rejection still reads on the current language of the rejected claims Nishizawa has compensating means that are particularly concerned with pivoting (rotating) members.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Scott Lowe whose telephone number is 703-305-1940. The examiner can normally be reached on 6:30am-4:30pm M,Tu,Th,F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eileen Lillis can be reached on 703-308-3248. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9326 for regular communications and 703-872-9327 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.



EILEEN D. LILLIS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600

msl
August 4, 2003